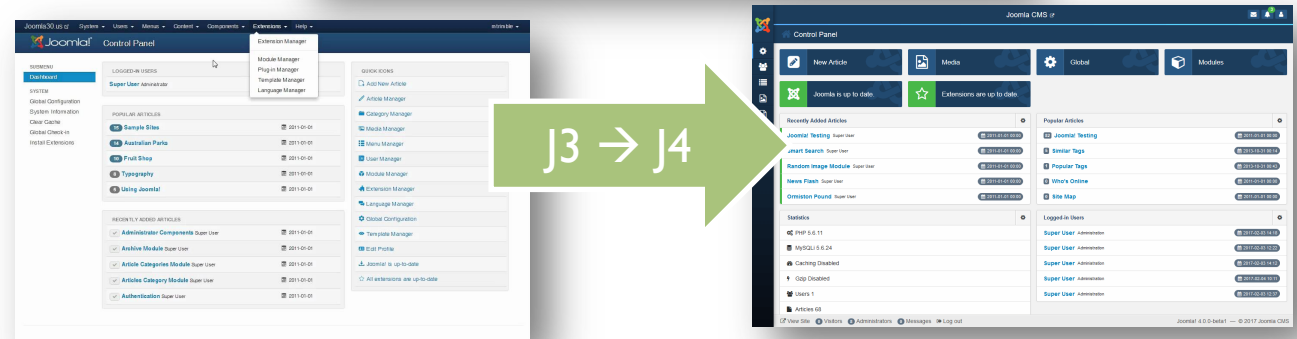


CHALLENGES

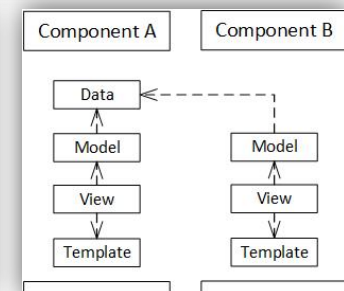
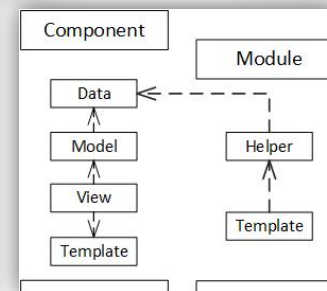
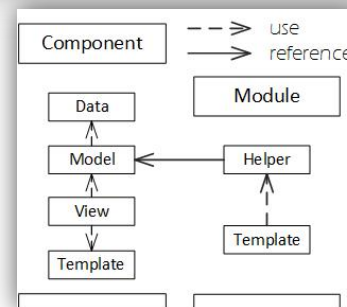
- Adhere to the required extension structure
 - Large amount of boilerplate code
 - Hard for new developers

	Name of the Component	MVC Type	Name of the View
com_users			
controllers			
group.php	class UsersControllerGroup		
groups.php	class UsersControllerGroups		
models			
group.php	class UsersModelGroup		
groups.php	class UsersModelGroups		
views			
group	class UsersViewGroup		
groups	class UsersViewGroups		

- Changes of underlying technology
 - Migration to new version
 - Migration to new system

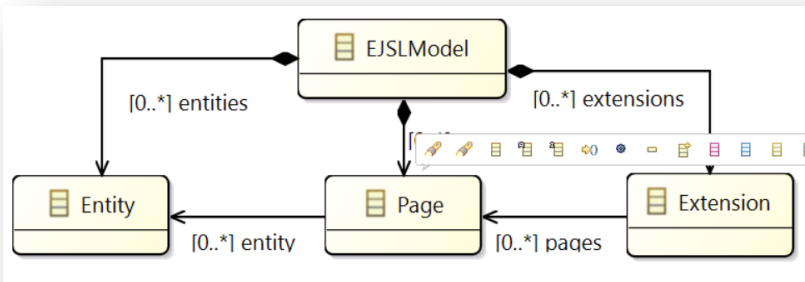


- Augmentation of existing extensions
 - Reverse engineering of existing extension
 - Dependencies to legacy code

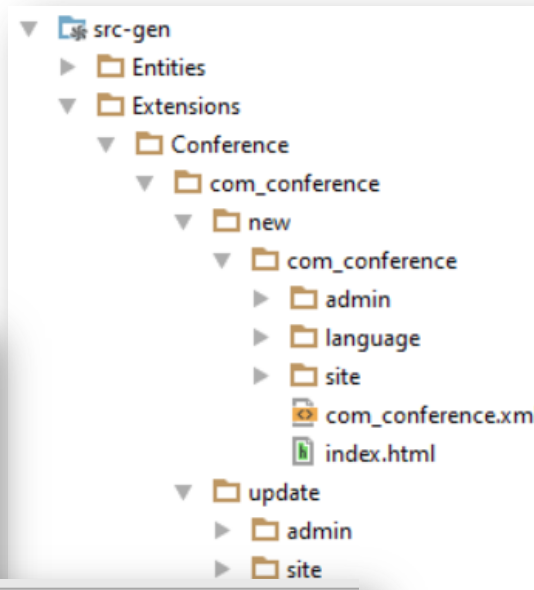


MODEL-DRIVEN DEVELOPMENT OF JOOMLA! EXTENSIONS

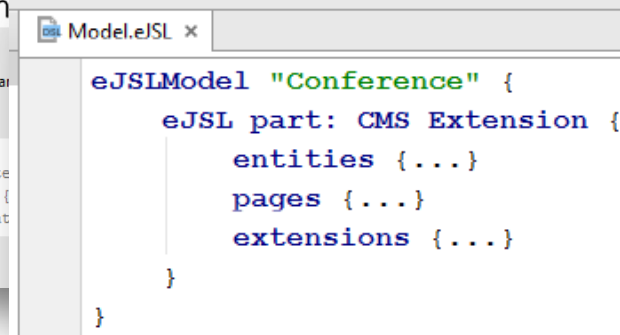
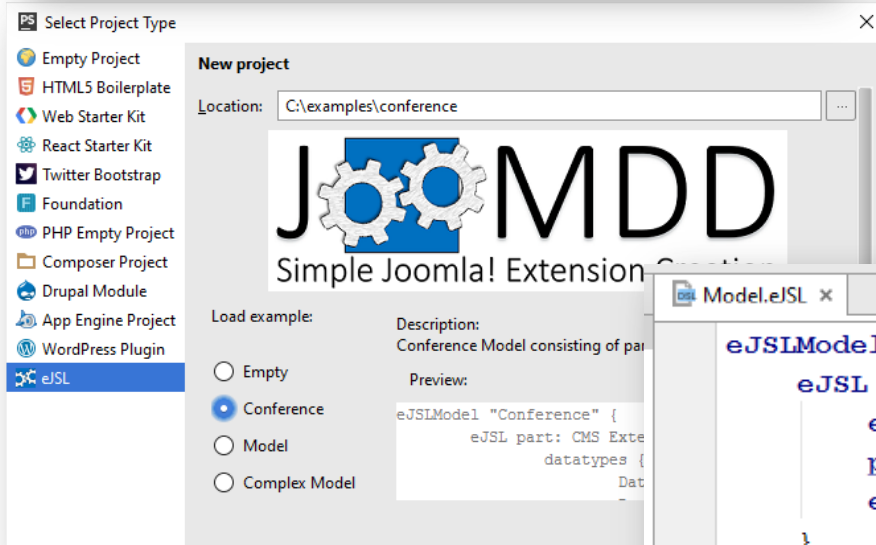
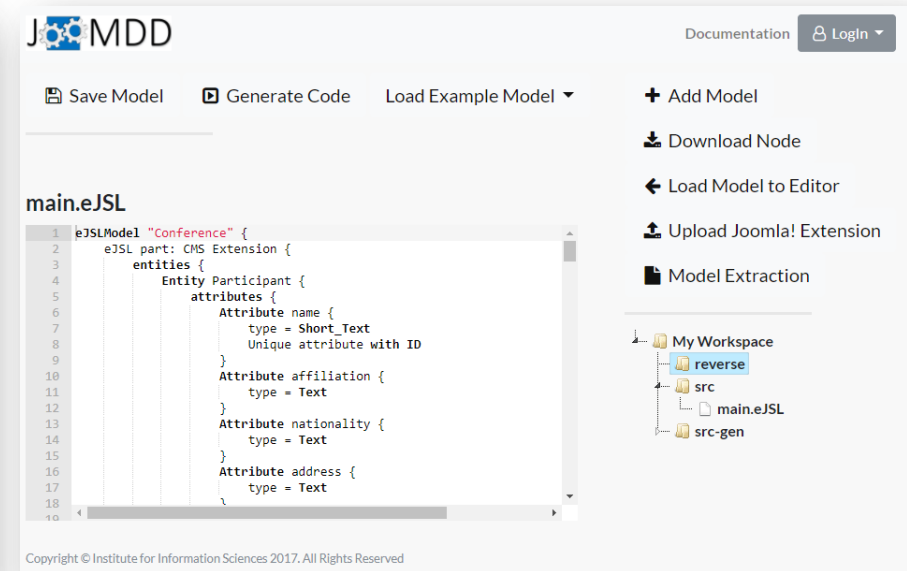
Domain-Specific Language



Code generator



Web editor with model extractor

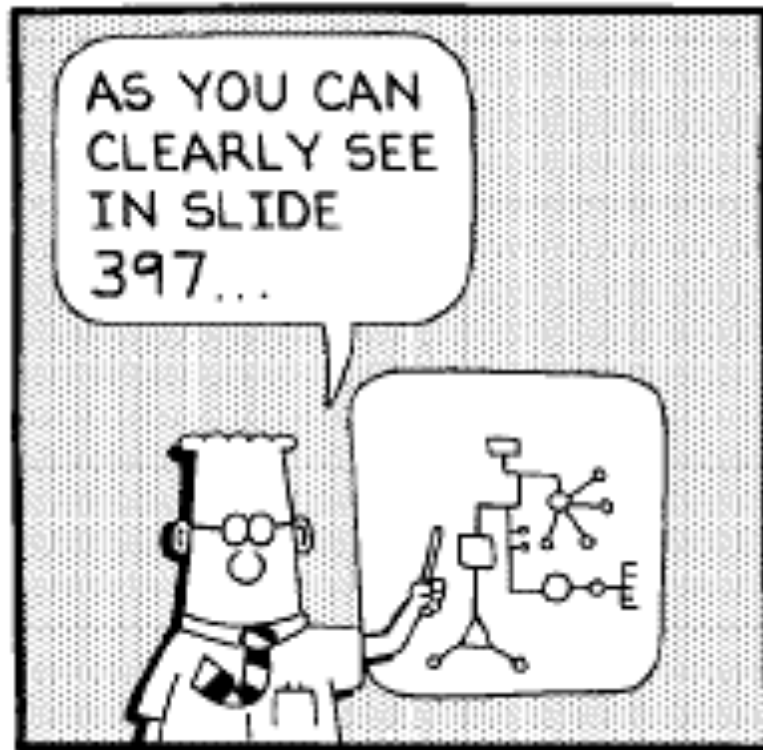


IDE plugins:

- Eclipse
- IntelliJ IDEA
- PhpStorm



SESSION



www.dilbert.com scottadams@aol.com



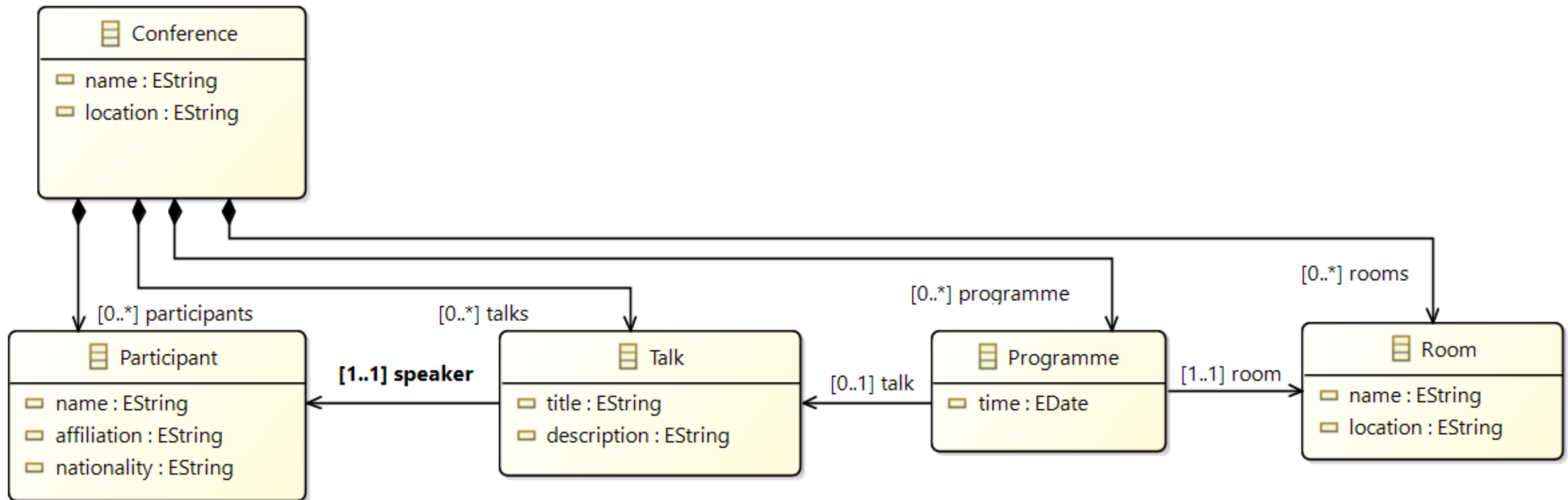
slide © 2000 United Feature Syndicate, Inc.



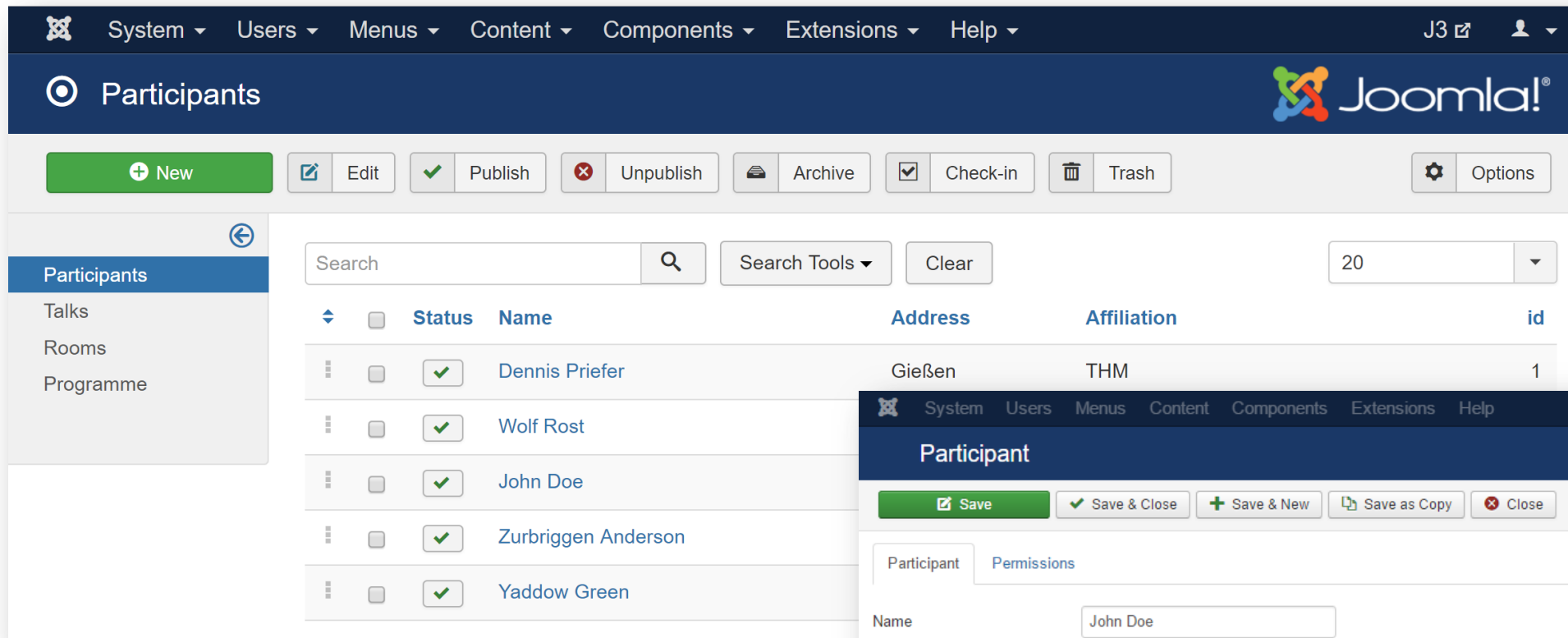
Copyright © 2000 United Feature Syndicate, Inc.
Redistribution in whole or in part prohibited

SESSION

CONFERENCE MANAGEMENT

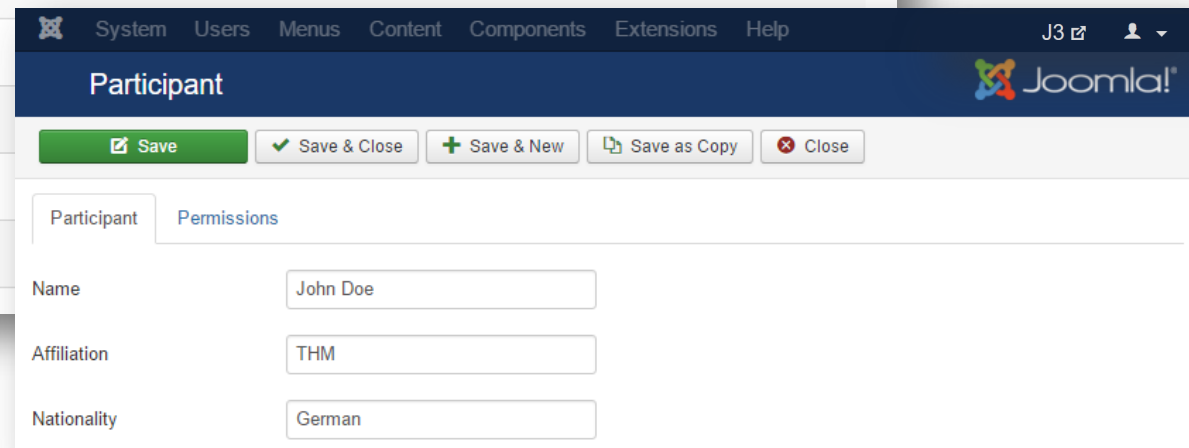


SESSION CONFERENCE MANAGEMENT



The screenshot shows the Joomla! administration interface for managing participants. The top navigation bar includes links for System, Users, Menus, Content, Components, Extensions, and Help. The main header displays the Joomla! logo and the title 'Participants'. Below the header, there is a toolbar with buttons for New, Edit, Publish, Unpublish, Archive, Check-in, and Trash. A sidebar on the left contains links for Participants, Talks, Rooms, and Programme. The main content area features a search bar, search tools, and a table of participants.

	Status	Name	Address	Affiliation	id
	<input checked="" type="checkbox"/>	Dennis Prierer	Gießen	THM	1
	<input checked="" type="checkbox"/>	Wolf Rost			
	<input checked="" type="checkbox"/>	John Doe			
	<input checked="" type="checkbox"/>	Zurbruggen Anderson			
	<input checked="" type="checkbox"/>	Yaddow Green			



The screenshot shows the Joomla! administration interface for editing a participant. The top navigation bar includes links for System, Users, Menus, Content, Components, Extensions, and Help. The main header displays the Joomla! logo and the title 'Participant'. Below the header, there is a toolbar with buttons for Save, Save & Close, Save & New, Save as Copy, and Close. The form has two tabs: Participant and Permissions. The Participant tab is active, showing fields for Name, Affiliation, and Nationality.

Participant

Name: John Doe

Affiliation: THM

Nationality: German

SESSION

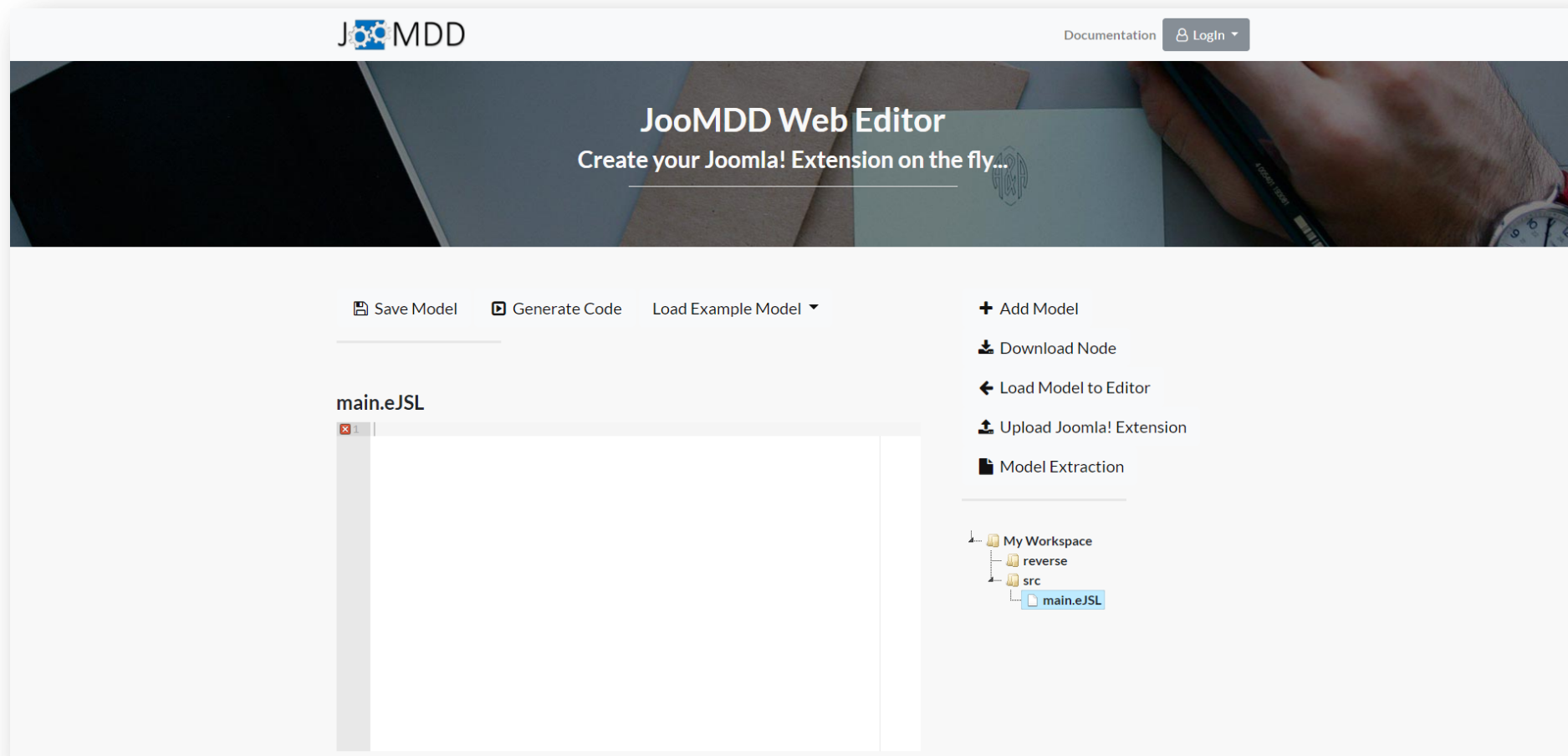
CONFERENCE MANAGEMENT

You are here: [Home](#) ▶ [Talks](#)

Title	Speaker
JooMDD - Simple Joomla Extension Creation	Dennis Priefer
iCampus Joomla Extensions	Wolf Rost
Design Patterns	John Doe
Internet of Things	Yaddow Green

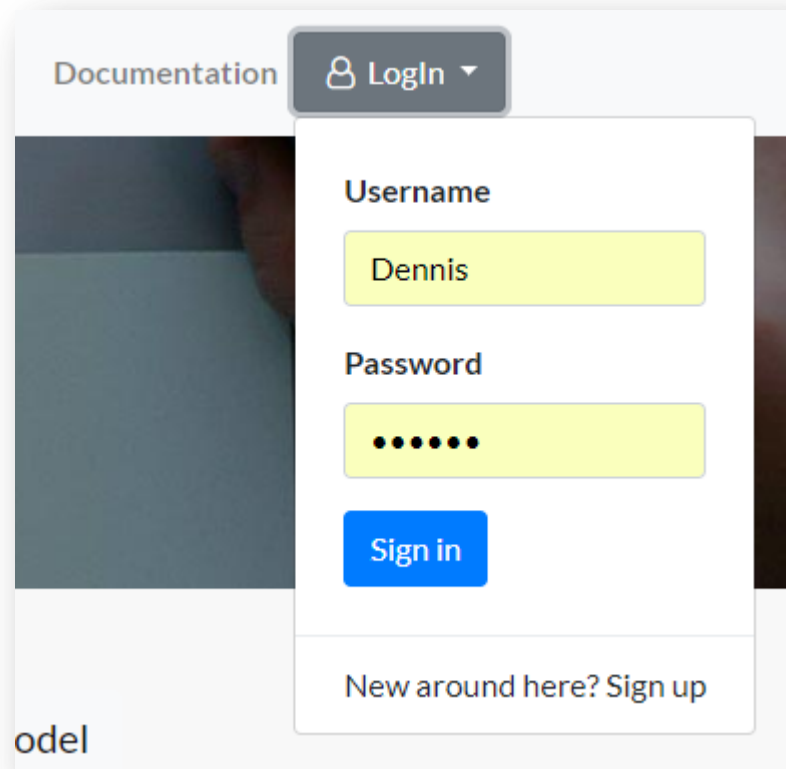
SESSION

THE EDITOR



SESSION

THE EDITOR



The screenshot shows a web application interface with a light gray header. On the left, there is a link labeled "Documentation". To its right is a "Login" button with a user icon and a dropdown arrow. Below the header, a login form is displayed. It contains two text input fields: "Username" with the value "Dennis" and "Password" with masked characters "••••••". Below these fields is a blue "Sign in" button. At the bottom of the form, there is a link that says "New around here? Sign up".

Documentation Login ▾

Username
Dennis

Password
••••••

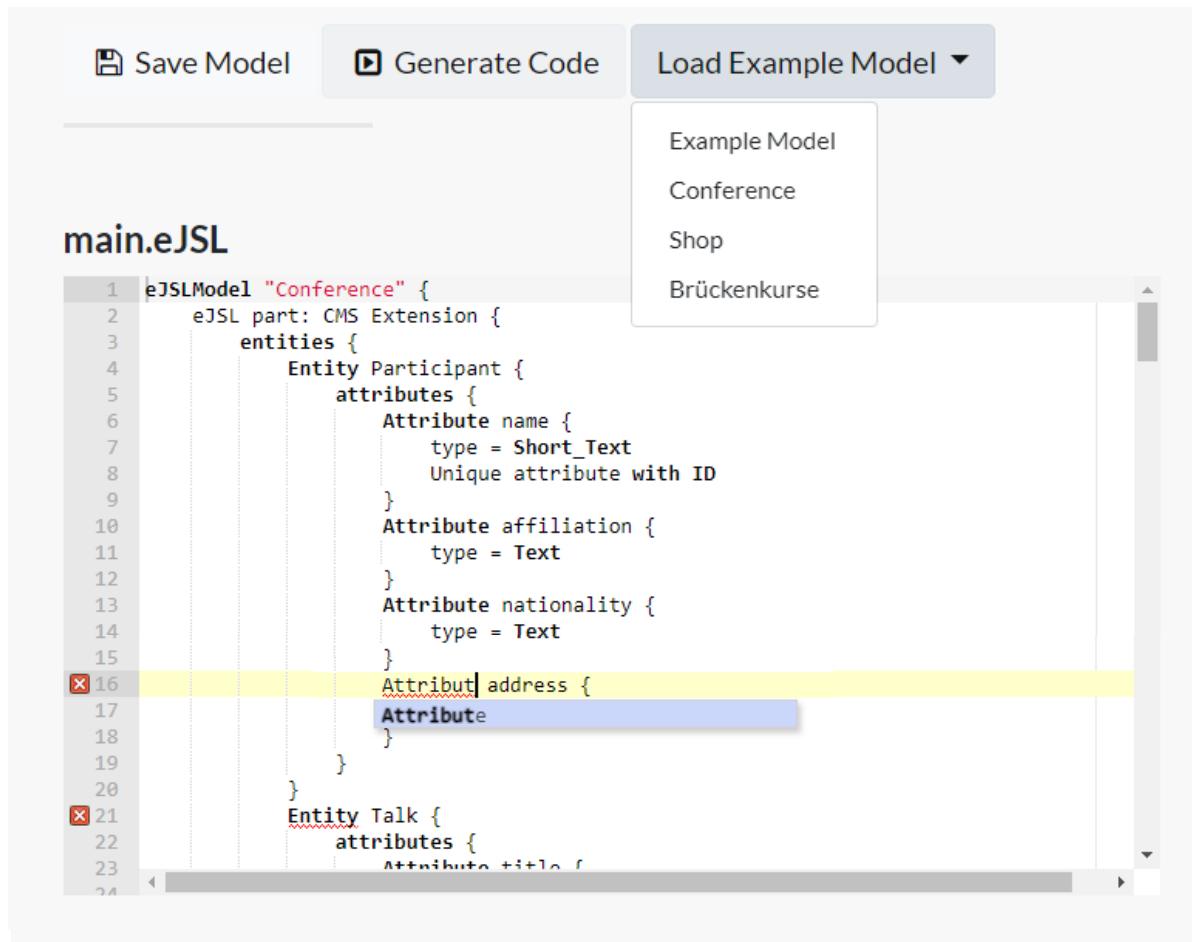
Sign in

New around here? Sign up

- Test the editor without an account
- Login to save your models and generated code

SESSION

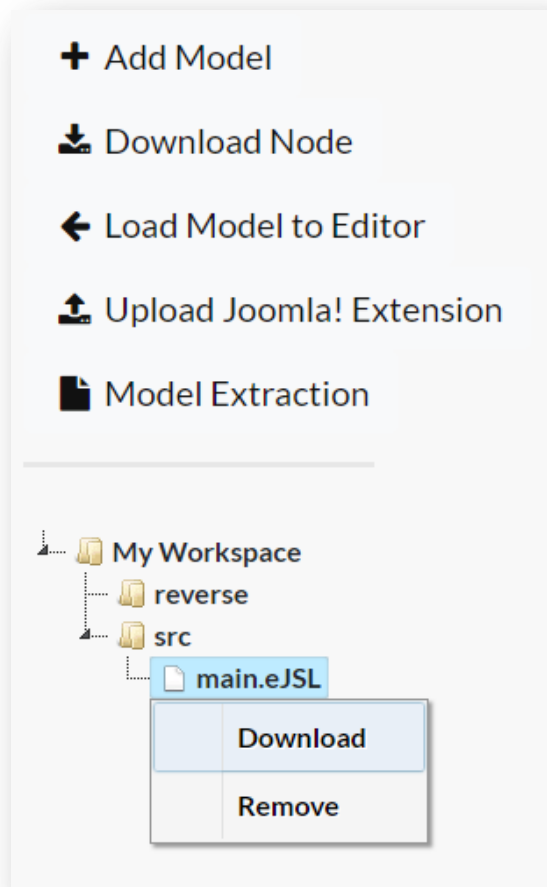
THE EDITOR



- Example models
- Auto completion
- Syntax highlighting
- Live validation
- Trigger code generation

SESSION

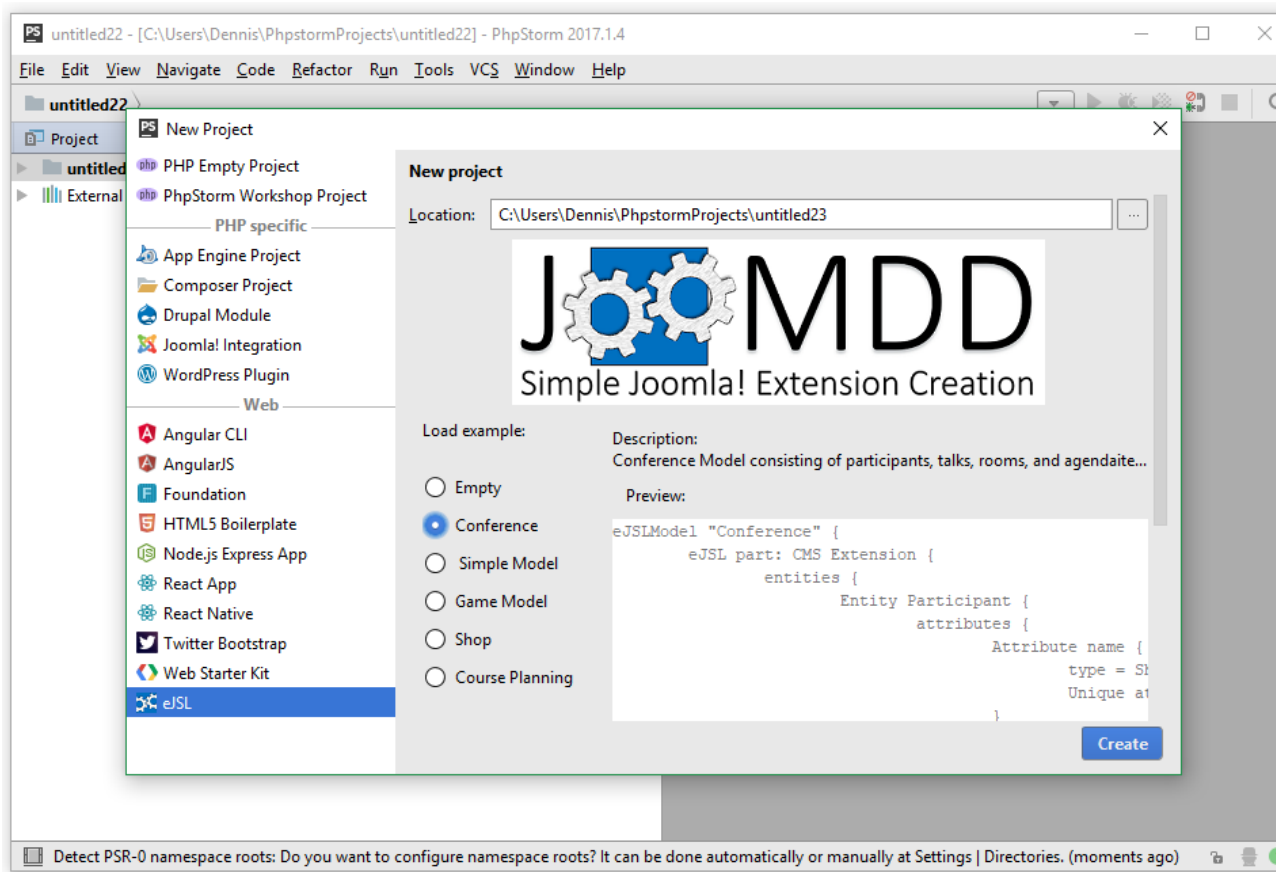
THE EDITOR



- File Tree
- Download of sub nodes via button and context menu
- Upload of existing Joomla! Extension
- Model extraction

SESSION

THE EDITOR



■ Alternative IDE plugins

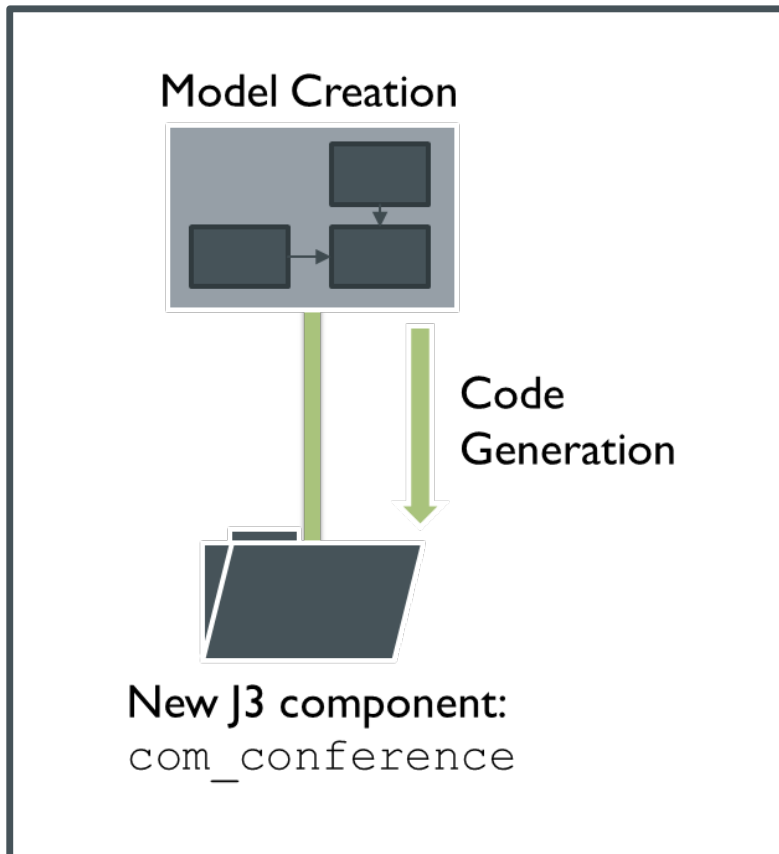
- Eclipse
- PhpStorm
- IntelliJ IDEA

→ Model extraction has to be executed manually with jext2ejsl

→ <https://github.com/icampus/jooMDD>

SESSION

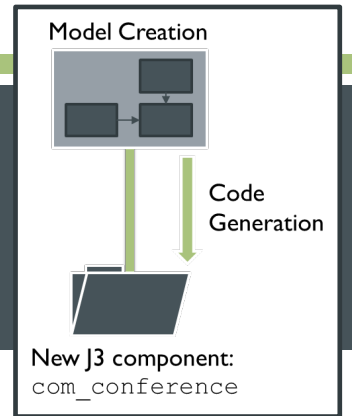
USE CASE I – DEVELOPMENT OF A JOOMLA COMPONENT



- Data Modelling (with references)
 - Page Modelling
 - Extension Modelling
 - Code Generation
 - Installation to Joomla 3.8 Site
 - Create Data
-
- Open the web editor: tinyurl.com/joomdd-web
 - Getting Started
 - Create an account (recommended)

SESSION

USE CASE I – DEVELOPMENT OF A JOOMLA COMPONENT



■ Data Modelling (with references)

Entities require a unique attribute

```
Entity Participant {
  attributes {
    Attribute name {
      type = Text
      Unique attribute with ID
    }
    Attribute affiliation {
      type = Text
    }
    Attribute nationality {
      type = Text
    }
    Attribute address {
      type = Text
    }
  }
}
```

^ must be used, if a name is a keyword. It will not be generated.

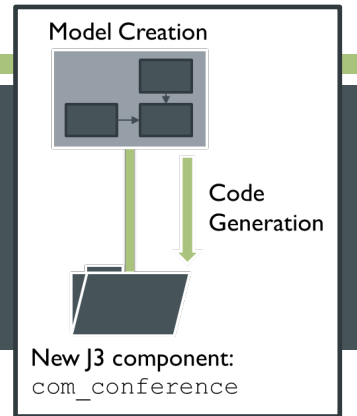
```
Entity Talk {
  attributes {
    Attribute title {
      type = Text
      Unique attribute
    }
    Attribute ^description {
      type = Text
    }
    Attribute speaker {
      type = Text
    }
  }
  references {
    Reference {
      EntityAttribute = speaker
      *Entity = Participant
      *EntityReference = Participant.name
      lower = 1
      upper = 1
    }
  }
}
```

```
Entity Room {
  attributes {
    Attribute roomname {
      type = Text
      Unique attribute
    }
    Attribute ^position {
      type = Text
    }
  }
}
```

Reference to another entity

SESSION

USE CASE I – DEVELOPMENT OF A JOOMLA COMPONENT



■ Page Modelling

```
IndexPage Participants {
  *Entities Participant
  table columns = Participant.name,
                  Participant.address,
                  Participant.affiliation
  filters = Participant.name, Participant.affiliation
  links {
    InternalcontextLink Details {
      target = Participant linked attribute = Participant.name
      linkparameters {
        Parameter name = *Attribute "Participant.name"
      }
    }
  }
}

DetailsPage Participant {
  *Entities Participant
  links {...}
}

IndexPage Talks {
  *Entities Talk
  table columns = Talk.title, Talk.speaker
  links {...}
}

DetailsPage Talk {
  *Entities Talk
  links {...}
}

IndexPage Rooms {...}
DetailsPage Room {...}
```

Entity reference

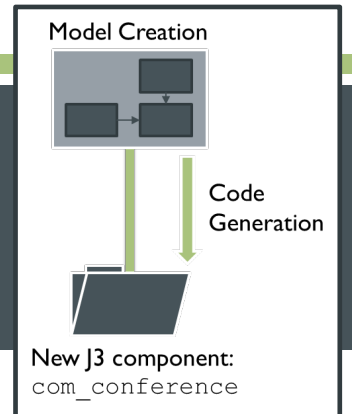
View table columns

Link to edit page

	Status	Name	Address	Affiliation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	John Doe	Gießen	THM
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Zurbruggen Anderson	US	Harvard University
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Zeliff Green	USA	Stanford University
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Yelton Robinson	USA	Massachusetts Institute of Technology

SESSION

USE CASE I – DEVELOPMENT OF A JOOMLA COMPONENT



■ Extension Modelling

Create your individual component

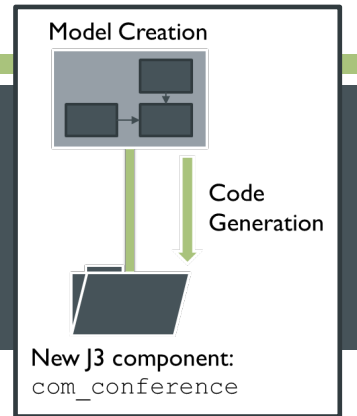
```
Component MyConference_Dennis {
  Manifestation {
    authors {
      Author "John Doe" {
        authoremail = "john.doe@example.org"
      }
    }
    copyright = "Copyright (C) 2017 All right reserved."
    license = "GNU General Public License"
    version = "1.0.1"
  }
  languages {
    Language de-DE {
    }
    Language en-GB {
    }
  }
}
```

```
sections {
  Frontend section {
    *Pages {
      *Page : Participants
      *Page : Talks
      *Page : Rooms
      *Page : Programme
    }
  }
  Backend section {
    *Pages {
      *Page : Participants
      *Page : Participant
      *Page : Talks
      *Page : Talk
      *Page : Rooms
      *Page : Room
      *Page : Programme
      *Page : Session
    }
  }
}
```

Component views

SESSION

USE CASE I – DEVELOPMENT OF A JOOMLA COMPONENT



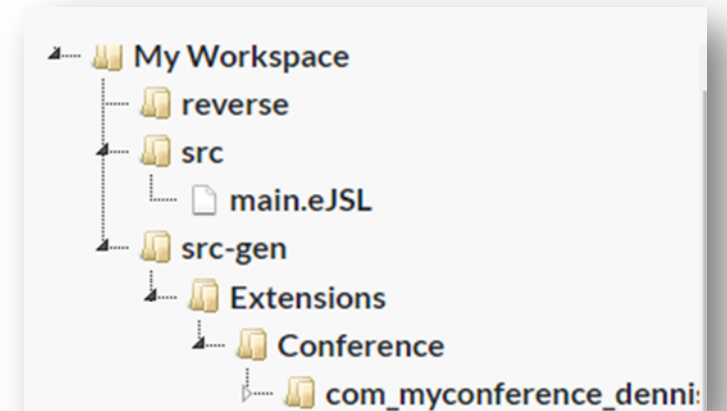
■ Code Generation

Save Model **Generate Code** Load Example Model ▼

Generate Joomla! 3.x code for the selected model.

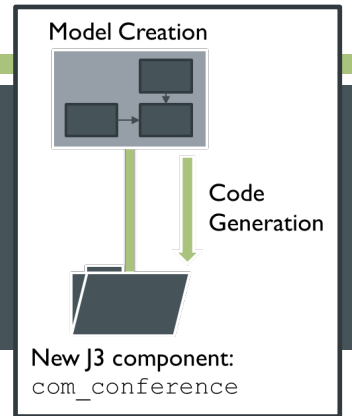
main.eJSL

```
1 eJSLModel "Conference" {
2   eJSL part: CMS Extension {
3     entities {
4       Entity Participant {
5         attributes {
6           Attribute name {
7             type = Short_Text
8             Unique attribute with ID
9           }
10          Attribute affiliation {
```



SESSION

USE CASE I – DEVELOPMENT OF A JOOMLA COMPONENT



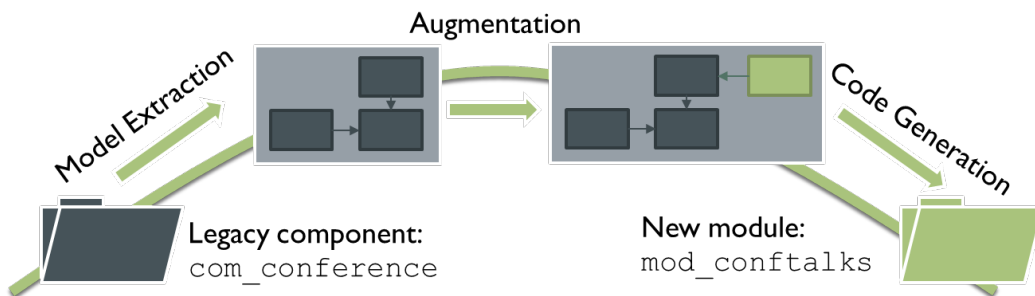
- Reinstallation to Joomla 3.8 Site
 - <http://icampus.thm.de/j3/administrator>
 - User: jdev
 - PW: jdevmeeting2017

- Create data for your own component

⌵	<input type="checkbox"/>	Status	Name	Address	Affiliation	ID ⌵
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	John Doe	Gießen	THM	1
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Zurbruggen Anderson	US	Harvard University	2
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Zeliff Green	USA	Stanford University	6
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Yelton Robinson	USA	Massachusetts Institute of Technology	7
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Yancy Roberts	USA	University of California, Berkeley	8
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Yaddow Green	London	University of Cambridge	9
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Gail Banks	5509 Lakeview St	University of Chicago	10
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Carrie Stephens	8221 Hebron Pkwy	Yale University	11
⋮	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Greg King	Switzerland	Swiss Federal Institute of Technology Zurich	12

SESSION

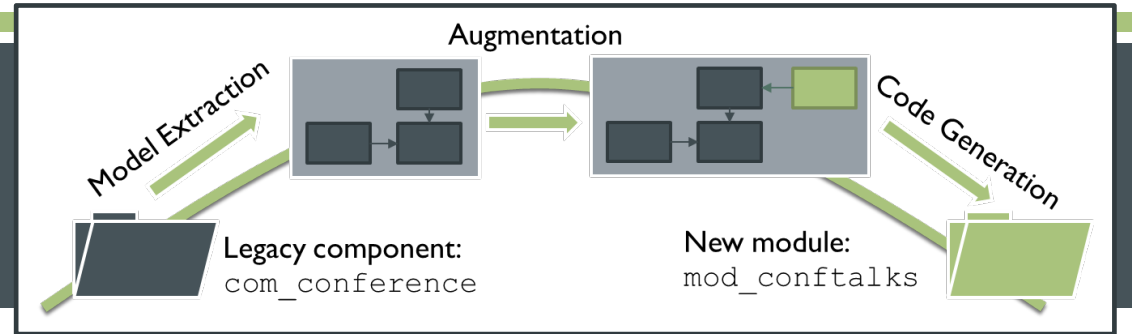
USE CASE 2 – AUGMENTATION OF AN EXISTING COMPONENT BY A NEW MODULE



- Export component from Joomla instance
- Model extraction with JooMDD editor
- Augmentation of the model
- Generation of new module
- Installation to Joomla 3.8 site
- Configure the module to be shown in the frontend

SESSION

USE CASE 2 – AUGMENTATION OF AN EXISTING COMPONENT BY A NEW MODULE



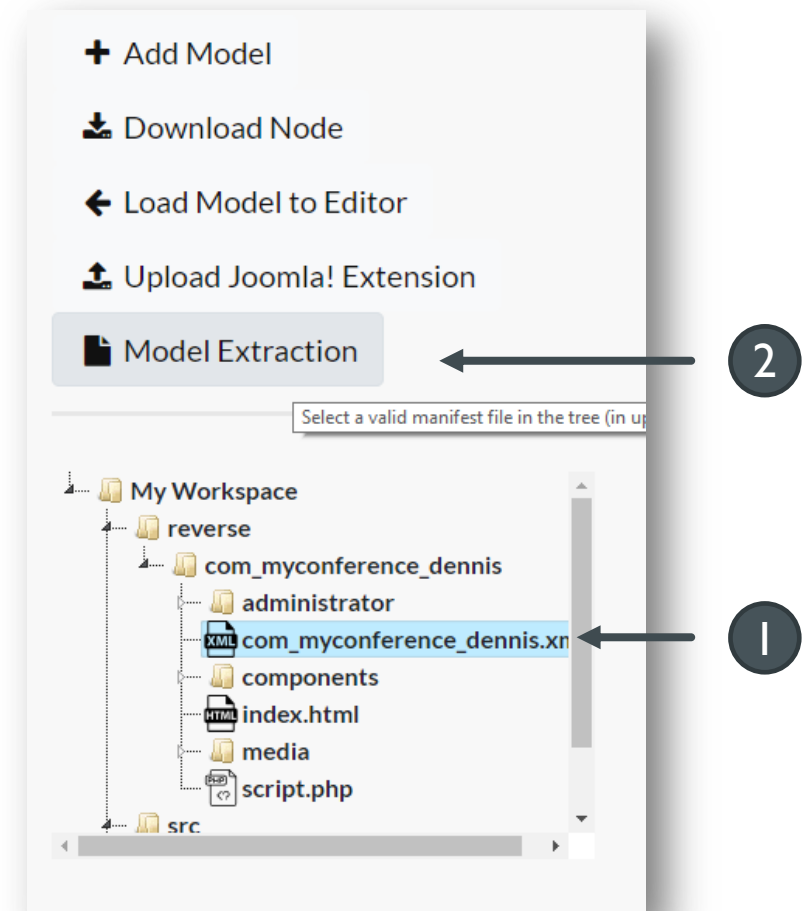
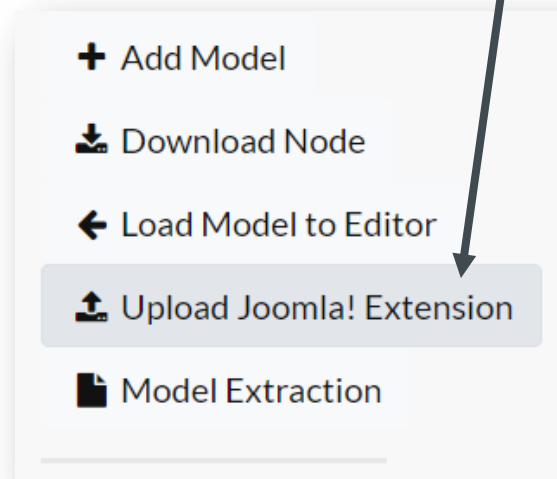
- Export component from Joomla instance (with ExtPorter) (legacy extension: *MyConference_<your name>*)

→ Use your generated component

- Model extraction with JooMDD editor

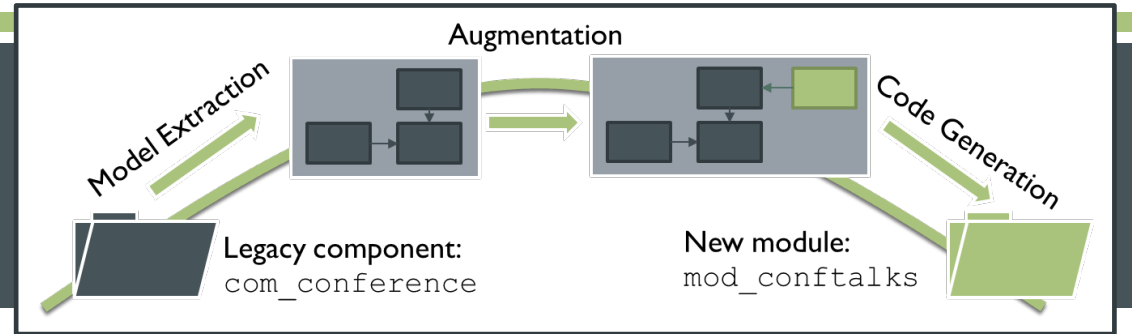
- Upload extension package
- Select manifest file
- Extract model

.zip file



SESSION

USE CASE 2 – AUGMENTATION OF AN EXISTING COMPONENT BY A NEW MODULE



- Load extracted model to the editor

Save Model Generate Code Load Example Model ▾

Success! Model Successfully loaded.

com_myconference_dennis.eJSL

```
1 eJSLModel "myconference_dennis" {
2   eJSL part: CMS Extension {
3     datatypes {
4       Datatype ^text="text",
5       Datatype ^room="room",
6       Datatype ^componentuser="componentuser",
7       Datatype ^tinyint_1="tinyint (1)",
8       Datatype ^rules="rules",
9       Datatype ^list="list",
10      Datatype ^programme="programme",
11      Datatype ^int_11="int (11)",
12      Datatype ^datetime="datetime",
13      Datatype ^talk="talk",
14      Datatype ^varchar_255="varchar (255)",
15      Datatype ^int="int",
16      Datatype ^participant="participant"
17    }
18  }
19  globalparameters {
20    Parameter ^time {
21      type = ^programme
22      label = "COM_MYCONFERENCE_DENNIS_FILTER_PROGRAMME_TIME"
23      description = "COM_MYCONFERENCE_DENNIS_FILTER_PROGRAMME_TIME"
24    }
25  }
26 }
```

+ Add Model

Download Node

← Load Model to Editor

Upload Joomla! Extension

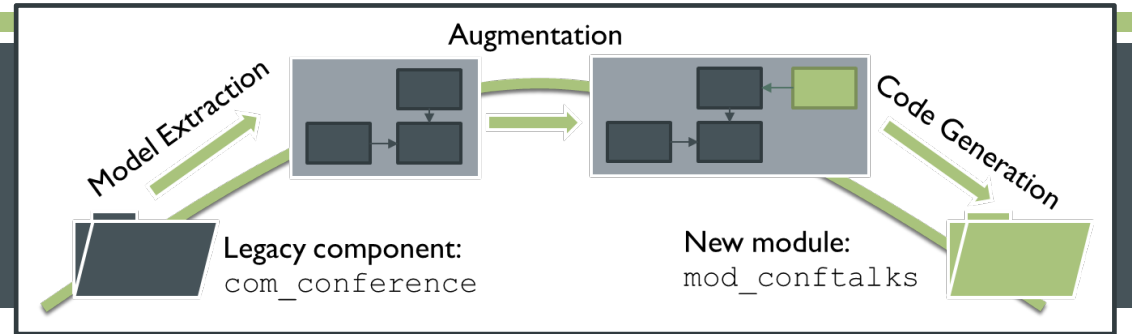
Model Extraction

My Workspace

- reverse
- src
 - com_myconference_dennis.eJSL
 - main.eJSL
- src-gen

SESSION

USE CASE 2 – AUGMENTATION OF AN EXISTING COMPONENT BY A NEW MODULE



- Augmentation of the model (*conftalks_<your name>*)

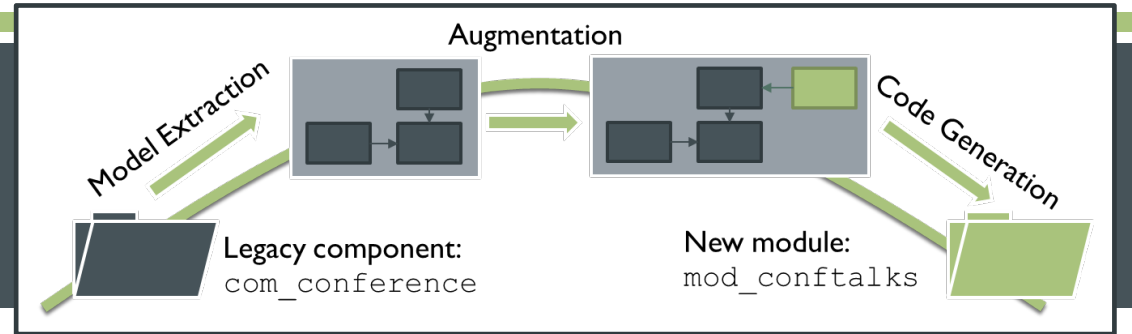
```
Module conftalks_Dennis {  
  Manifestation {  
    authors {  
      Author "Dennis Priefer" {  
        authoremail = "dennis.priefer@example.org"  
        authorurl = "https://www.gibts.net"  
      }  
    }  
    copyright = "Copyright (C) 2017 All right reserved."  
    license = "GNU General Public License"  
  }  
  languages {  
    Language de-DE {}  
    Language en-GB {}  
  }  
  *Page : ^talks from : ^myconference_dennis data backendDAO  
}
```

backendDAO
backendDAO
database
frontendDAO
webservice

Use the model of the component's backend

SESSION

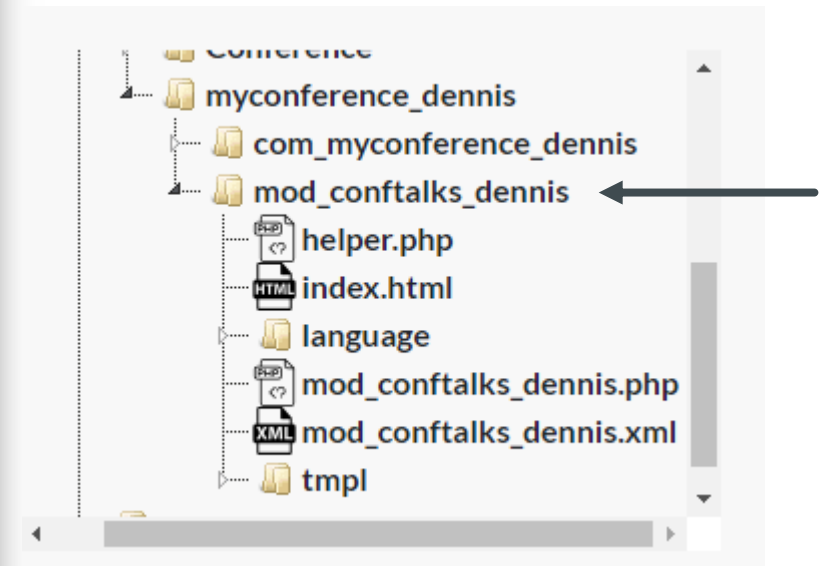
USE CASE 2 – AUGMENTATION OF AN EXISTING COMPONENT BY A NEW MODULE



■ Generation of new module

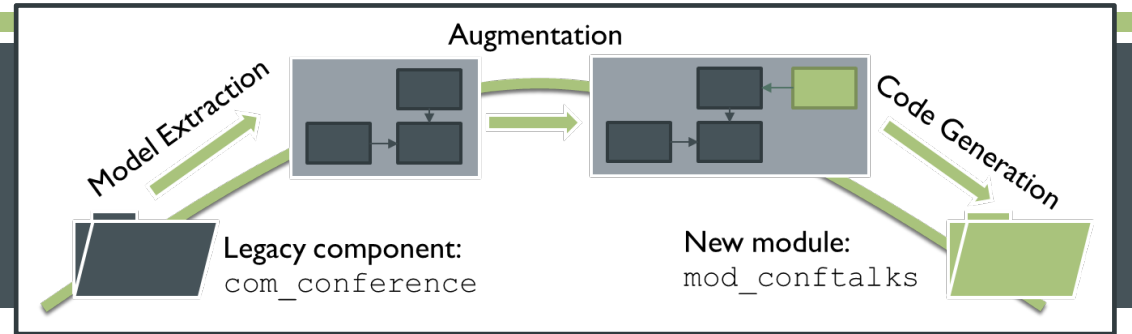
The screenshot shows the 'Save Model' interface. The 'Generate Code' button is highlighted with a tooltip that reads: 'Generate Joomla! 3.x code for the selected model.' Below the button, the generated code is displayed in a text area labeled 'main.eJSL'.

```
1 eJSLModel "Conference" {
2   eJSL part: CMS Extension {
3     entities {
4       Entity Participant {
5         attributes {
6           Attribute name {
7             type = Short_Text
8             Unique attribute with ID
9           }
10          Attribute affiliation {
```



SESSION

USE CASE 2 – AUGMENTATION OF AN EXISTING COMPONENT BY A NEW MODULE



- Installation to Joomla 3.8 Site
 - <http://icampus.thm.de/j3/administrator>
 - User: jdev
 - PW: jdevmeeting2017
- Configure your module to be placed in the frontend

J3

You are here: [Home](#) > [Programme](#)

Search

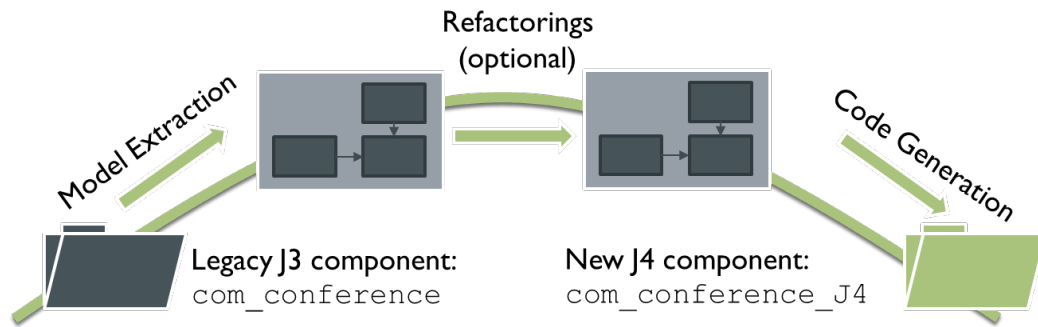
Room	Talk	Time	Title
123	Design Patterns	2016-04-16 10:00:00	Design Patterns
14	JooMDD - Simple Joomla Extension Creation	2016-04-16 14:00:00	JooMDD
25	Internet of Things	2016-04-17 11:00:00	IoT

Conf_talks

- JooMDD - Simple Joomla Extension Creation Talk about JooMDD Dennis Priefer 1 74 1 1 0000-00-00 00:00:00 0 Super User 0 1
- iCampus Joomla Extensions Presentation of iCampus Wolf Rost 2 75 1 2 0000-00-00 00:00:00 0 Super User 0 2
- Design Patterns John Doe 3 76 1 3 0000-00-00 00:00:00 0 Super User 0 3
- Internet of Things Yaddow Green 4 77 1 4 0000-00-00 00:00:00 0 Super User 0 5

SESSION

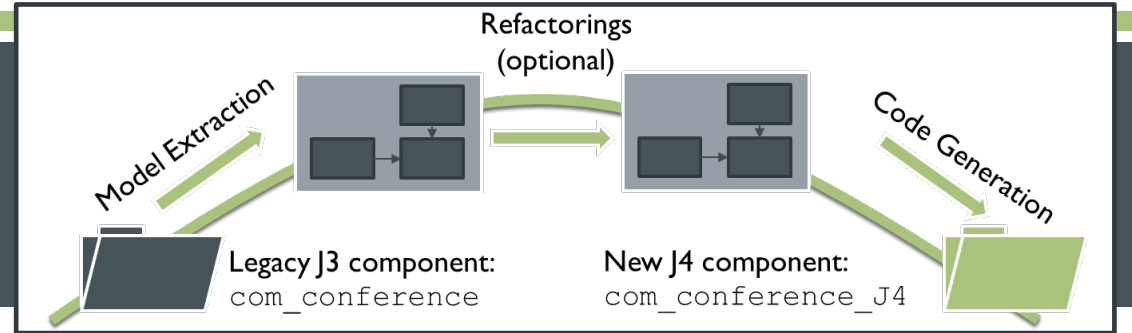
USE CASE 3 – MIGRATION OF AN EXISTING COMPONENT FROM JOOMLA 3 TO JOOMLA 4



- Export component from Joomla instance
- Model extraction with JooMDD editor
- Optional Refactorings
- Generation of new J4 extension
- ...

SESSION

USE CASE 3 – MIGRATION OF AN EXISTING COMPONENT FROM JOOMLA 3 TO JOOMLA 4



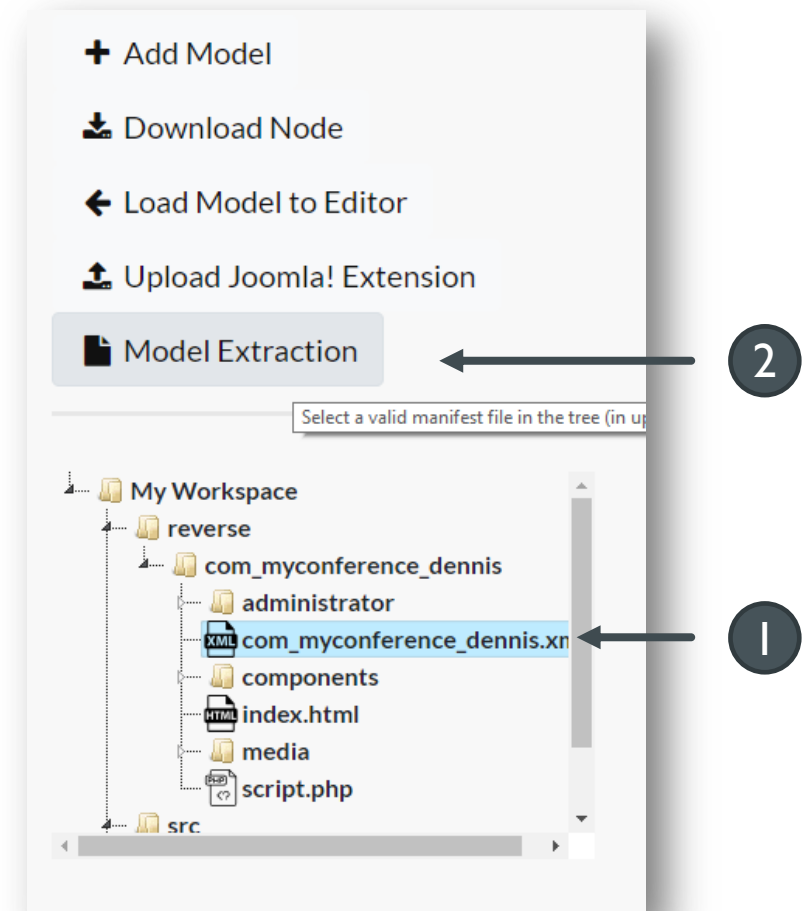
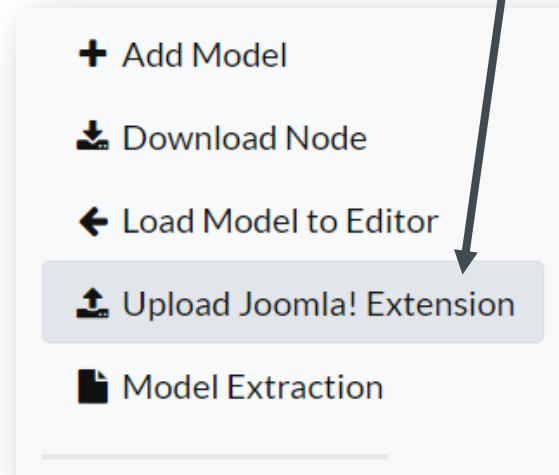
- Export component from Joomla instance (with ExtPorter)
(legacy extension: *MyConference_<your name>*)

→ Use your generated component

- Model extraction with JooMDD editor

- Upload extension package
- Select manifest file
- Extract model

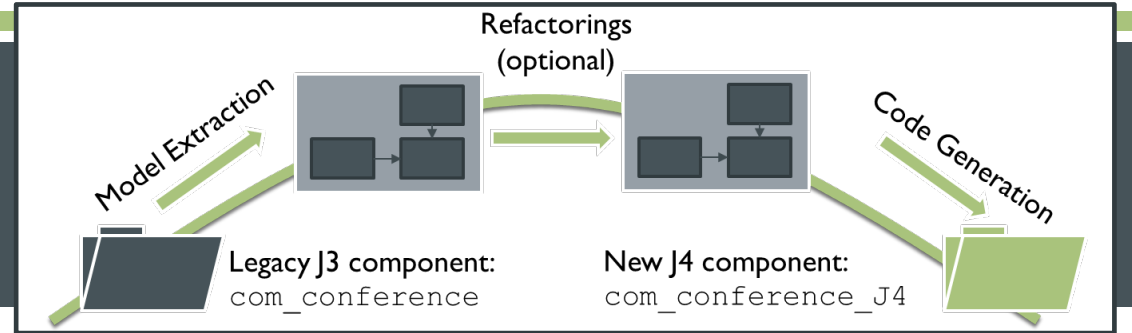
.zip file



→ **Alternative: use your extracted model from use case 2**

SESSION

USE CASE 3 – MIGRATION OF AN EXISTING COMPONENT FROM JOOMLA 3 TO JOOMLA 4

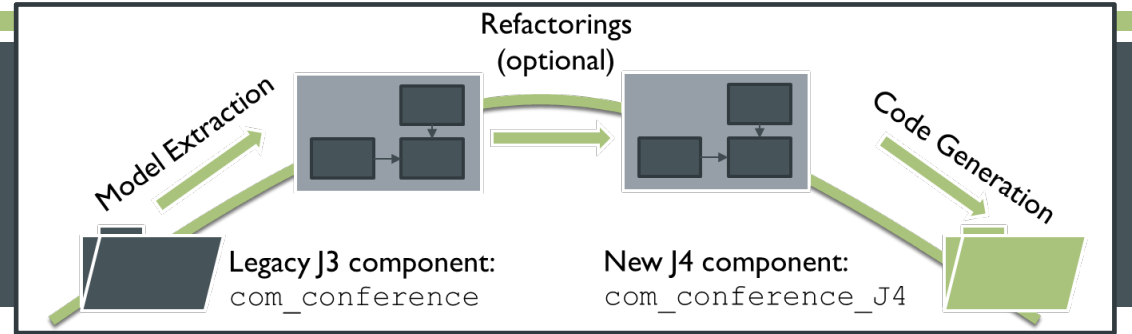


■ Optional Refactorings

```
387     }
388
389     extensions {
390         Component ^myconference_dennis_J4 { ←
391             Manifestation {
392                 authors {
393                     Author "Dennis Priefer" {
394                         authoremail = "dennis.priefer@example.org"
395                         authorurl = ""
396                     }
397                 }
398                 copyright = "Copyright (C) 2017 All right reserved."
399                 license = "GNU General Public License"
400             }
401             languages {
402                 Language de-DE {}
403                 Language en-GB {} ←
404             }
405             sections {
406                 Frontend section {
407                     *Pages {
408                         *Page : ^participants
409                         *Page : ^programme
410                     }
411                 }
412             }
413         }
414     }
415 }
```

SESSION

USE CASE 3 – MIGRATION OF AN EXISTING COMPONENT FROM JOOMLA 3 TO JOOMLA 4



- Generation of new J4 extension

2

Save Model

Generate Code

Joomla 3

Load Example Model

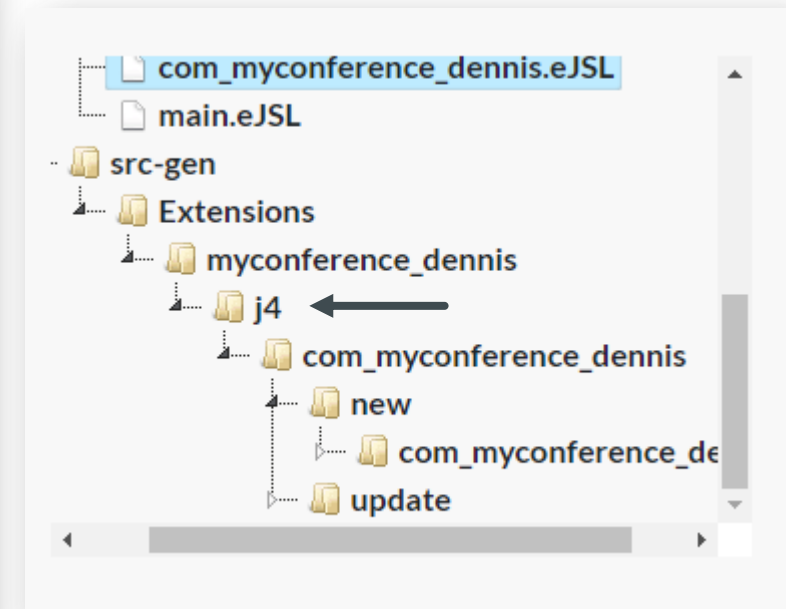
Joomla 3

Joomla 4

Success! Model Successfully loaded.

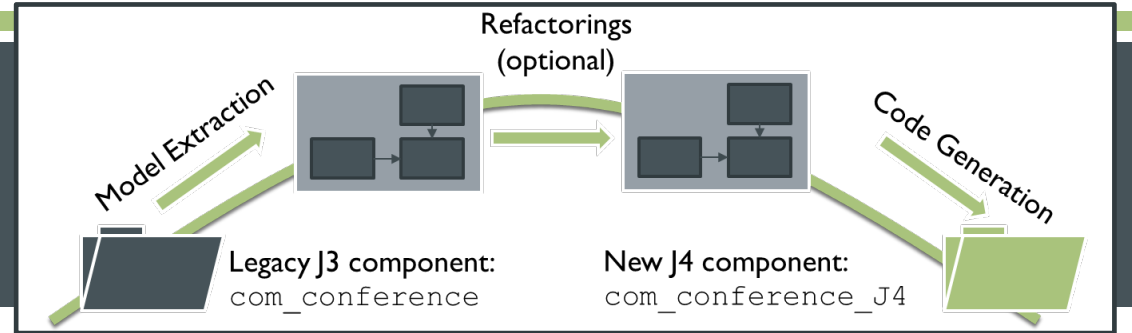
com_myconference_dennis.eJSL

```
1 eJSLModel "myconference_dennis" {
2   eJSL part: CMS Extension {
3     datatypes {
4       Datatype ^text="text",
5       Datatype ^room="room",
6       Datatype ^componentuser="componentuser",
7       Datatype ^tinyint_1="tinyint (1)",
8       Datatype ^rules="rules",
9       Datatype ^list="list",
```



SESSION

USE CASE 3 – MIGRATION OF AN EXISTING COMPONENT FROM JOOMLA 3 TO JOOMLA 4



- Have fun with Joomla 4 😊

- Controller
- Field
- forms
- Helper
- language
- Model
- sql
- Table
- tmpl
- View
- access
- config
- dispatcher

```
<?php
namespace Joomla\Component\myconference\Administrator\View\talk;

/** @version 1.0.1 ... */

defined( name: '_JEXEC' ) or die('Restricted access');

use Joomla\CMS\MVC\View\HtmlView as BaseHtmlView;
use Joomla\CMS\Language\Text;

/**
 * @description talkView for myconference
 */
jimport('joomla.filesystem.path');

/** myconferenceView class for component com_myconference ... */
class HtmlView extends BaseHtmlView
{
```